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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,774	01/18/2006	Remy Bruno	0512-1288	9225

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YOUNG & THOMPSON  
209 Madison Street  
Suite 500  
Alexandria, VA 22314

EXAMINER
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LAO, LUN S

ART UNIT	PAPER NUMBER
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2614

NOTIFICATION DATE	DELIVERY MODE
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09/30/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/542,774	<b>Applicant(s)</b> BRUNO ET AL.	
	<b>Examiner</b> LUN-SEE LAO	<b>Art Unit</b> 2614	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### *Introduction*

1. This action is response to the amendment filed on 03-05-2010. Claim 1 has been amended. Claims 1-28 are pending.

### ***Continued Examination Under 37 CFR 1.114***

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 03-05-2010 has been entered.

### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “determining via a computer parameters describing the reproduction direction of each channel of a multi-channel audio signal, determining via a computer at least spatial characteristics of the reproduction unit, the spatial characteristics comprising at least the direction of each reproduction element in the three spatial dimensions relative to a given point, wherein the determined directions of the reproduction elements are different from the reproduction directions of the multi-channel audio signal, determining via a computer a

Art Unit: 2614

spatial adaptation matrix using the determined directions of the reproduction elements and the parameters describing the reproduction directions, wherein the spatial adaptation matrix is determined such that controlling the reproduction elements with the controlling signals reproduces, in a region comprising the given point, the acoustic field that would have been obtained by controlling, with the multi-channel audio signal, ideal reproduction elements which would exactly comply with the reproduction directions of the multi-channel audio signal" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnold et al. (US PAT. 6,154,549) in view of Gerzon et al. (US PAT. 5,757,927).

Consider claim 1 Arnold teaches a method for controlling an acoustic field reproduction unit comprising a plurality of reproduction elements (see fig.1) comprising:

determining via a computer parameters describing the reproduction direction of each channel of a multi-channel audio signal (see fig.1 (10), (reads on the sound source, the sound source may be a stereophonic or an quadraphonic, a stereophonic or an quadraphonic includes two or more channels) and see col. 1 line 58-col. 2 line 54),

determining via a computer at least spatial characteristics of the reproduction unit, the spatial characteristics comprising at least the direction of each reproduction element in the three spatial dimensions relative to a given point (see figs 1-6 (20) and see col. 9 line 30-col. 10 line 67), wherein the determined directions of the reproduction elements are different from the reproduction directions of the multi-channel audio signal(see figs. 1, 11(16), determining via a computer a spatial adaptation using the determined directions of the reproduction elements and the parameters describing the reproduction

Art Unit: 2614

directions (see figs 1-6 and col.11 line1-col. 12 line 36), Arnold does not explicitly teach a spatial adaptation matrix using the determined directions of the reproduction elements and the parameters describing the reproduction directions, wherein the spatial adaptation matrix is determined such that controlling the reproduction elements with the controlling signals reproduces, in a region comprising the given point, the acoustic field that would have been obtained by controlling, with the multi-channel audio signal, ideal reproduction elements which would exactly comply with the reproduction directions of the multi-channel audio signal.

However, Gerzon teaches a spatial adaptation matrix using the determined directions of the reproduction elements and the parameters describing the reproduction directions(see figs. 2-9), wherein the spatial adaptation matrix is determined such that controlling the reproduction elements with the controlling signals reproduces, in a region comprising the given point, the acoustic field that would have been obtained by controlling, with the multi-channel audio signal(see fig.14 (L, R)), ideal reproduction elements which would exactly comply with the reproduction directions of the multi-channel audio signal(CL, CR, LF, RF, LB, RB)(see figs 1-14 and see col. 25 line 25-col. 26 line 67).

Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to combine the teaching of Gerzon into Arnold to provide more efficiency to control reproduction sound field by using a matrix determined directions.

Consider claims 2-4, Arnold as modified by Gerzon teaches determining at least spatial characteristics of the reproduction unit (see fig.1 ) comprises an acquisition sub-

Art Unit: 2614

step enabling all or some of the characteristics of the reproduction unit to be determined(see abstract); and characterized in that the step for determining at least spatial characteristics of the reproduction unit (see fig.1) comprises a calibration step enabling all or some of the characteristics of the reproduction unit (see fig.1) to be provided (see figs 1-6 and see col. 9 line 30-col. 10 line 67); and the calibration sub-step (30) comprises, in the case of at least one of the reproduction elements (16) :

a sub-step for transmitting a specific signal (122) to the at least one element (16) of the reproduction unit (see fig.1); a sub-step for acquiring the sound wave emitted in response by the at least one element (16); a sub-step (131) for converting the acquired signals into a finite number of coefficients representative of the emitted sound wave; and a sub-step (32) for determining spatial and/or sound parameters of the element (3n) on the basis of the coefficients representative of the emitted sound wave(16) (see figs 1-6 and see col. 11 line 1-col. 12 line 36).

Consider claims 5-7, Arnold as modified by Gerzon teaches method where in the calibration sub-step also comprises a sub-step for determining the position in at least one of the three spatial dimensions of the at least one element of the reproduction unit (see fig. 1 and see col. 9 line 30-col. 10 line 67); and characterized in that the calibration step comprises a sub-step for determining the frequency response of the at least one element of the reproduction unit(see fig. 1 and see col. 9 line 30-col. 10 line 67); and to characterized in that step for determining adaptation filters(see fig 5(102,122)) comprises: a sub-step for determining a decoding matrix representative of filters permitting compensation for the changes in reproduction caused by the spatial

Art Unit: 2614

characteristics of the reproduction unit (104); a sub-step for determining an ideal multi-channel radiation matrix representative of the predetermined general directions associated with each data signal of the plurality of input signals ( $U(n)$ ); and a sub-step for determining a matrix representative of the adaptation filters using the decoding matrix and the multi-channel radiation matrix (In Gerzon, see fig. 10 (22, 23) and col.16 line 5-col. 17 line 67).

Consider claims 8-10, Arnold as modified by Gerzon teaches method wherein step for determining adaptation filters(see fig.10 (22, 23)) comprises a plurality of calculation sub-steps permitting the provision of a limit order of the spatial precision of the adaptation filters, a matrix corresponding to a spatial window representative of the distribution in space of the desired precision during the reconstruction of the sound field, and a matrix representative of the radiation of the reproduction unit, the sub-step for calculating the decoding matrix being carried out using the results of these calculation sub steps (In Gerzon, see figs 2-10 and col. 16 line 5-col. 17 line 67); and characterized in that the matrices for decoding , ideal multi-channel radiation and adaptation are independent of the frequency, step for determining at least one signal for controlling the elements of the reproduction unit by applying the adaptation filters corresponding to simple linear combinations followed by a delay (In Gerzon, see figs. 4-10 and col. 7 line 39-55 and col. 16 line 5 –col. 17 line 67); and method wherein the step for determining characteristics of the reproduction unit (see fig.5 (104)) permits the determination of sound characteristics of the reproduction unit (104)) and in that the method comprises a step (60) for determining filters for compensating for these sound



Art Unit: 2614

characteristics, the step for determining at least one control signal then comprising a sub-step for applying the sound compensation filters (In Gerzon, see fig. 10 (22,23) and col.16 line 5-col. 17 line 67).

Consider claims 11-14, Arnold as modified by Gerzon teaches method wherein that the step for determining sound characteristics is suitable for providing parameters representative, in the case of at least one element, of its frequency response (see fig. 1 and see col. 9 line 30-col. 10 line 67); and method wherein that the step for determining at least one control signal comprises a sub-step for adjusting the gain and applying delays in order to align temporally the wave front of the reproduction elements (see fig. 1 (16)) as a function of their distance from the given point (see figs. 1-6 and see col. 31 line 28- 67); and the computer program comprising program code instructions for performing the steps of the method according to claim 1 when the program is performed by a computer (see fig. 1 and see col. 9 line 30-col. 10 line 67); and the removable medium of the type comprising at least one processor and a non-volatile memory element, wherein the memory comprises a program comprising code instructions for performing the steps of the method according to claim 1, when the processor performs the program (see fig. 1 and see col. 9 line 30-col. 10 line 67).

Consider claim 15 Arnold teaches a device for controlling an acoustic field reproduction unit (see fig.1) comprising a plurality of reproduction elements(16) comprising – means(30) for determining parameters describing the reproduction direction of each channel of a multi-channel audio signal (see fig.1 (10), (reads on the sound source, the sound source may be a stereophonic or an quadraphonic, a

Art Unit: 2614

stereophonic or an quadraphonic is including tow or more channels) and see col. 1 line 58-col. 2 line 54),

- means (32) for determining at least spatial characteristics of the reproduction unit (see fig.1), the spatial characteristics comprising at least the direction of each reproduction element in the three spatial dimensions relative to the given, wherein the determined directions of the reproduction elements are different from the reproduction directions of the multi-channel audio signal(see figs. 1, 11(16) and see col. 9 line 30-col. 10 line 67), means (30) for determining spatial adaptation table using the determined directions of the reproduction elements and the parameters describing the reproduction(see figs. 1-6 and see col. 11 line 1-col. 12 line 36); Arnold does not explicitly teach means for determining spatial adaptation matrix using the determined directions of the reproduction elements and the parameters describing the reproduction,

- means for determining a controlling signal for each reproduction element, by applying the adaptation matrix to the multi-channel audio signal, wherein the spatial adaptation matrix is determined such that controlling the reproduction elements with the controlling signals reproduces, in a region comprising the given point, the acoustic field that would have been obtained by controlling, with the multi-channel audio signal, ideal reproduction elements which would exactly comply with the reproduction directions of the multi-channel audio signal.

However, Gerzon teaches means(see figs.10,14 (22,23)) for determining spatial adaptation matrix using the determined directions of the reproduction elements and the parameters describing the reproduction((W,X,Y) in fig. 10 and (L,R) in fig. 14), -

Art Unit: 2614

means(122) for determining a controlling signal for each reproduction element, by applying the adaptation matrix to the multi-channel audio signal, wherein the spatial adaptation matrix is determined such that controlling the reproduction elements with the controlling signals reproduces, in a region comprising the given point(listener) (see col.16 line 5-col. 17 line 67), the acoustic field that would have been obtained by controlling, with the multi-channel audio signal, ideal reproduction elements which would exactly comply with the reproduction directions of the multi-channel audio signal(CL, CR, LF, RF, LB, RB)(see figs 1-14 and see col. 25 line 25-col. 26 line 67).

Therefore, it would have been obvious to one of the ordinary skill in the art at the time the invention was made to combine the teaching of Gerzon into Arnold to provide more efficiency to control reproduction sound field by using a matrix determined directions.

Consider claims 16-18, Arnold as modified by Gerzon teaches a device wherein that the means(see fig.1) for determining the at least spatial characteristics of the reproduction unit (see fig. 1) comprise means (38) for the direct acquisition of the characteristics(see figs. 1-6 and see col. 9 line 30-col. 10 line 67); and a device wherein it is suitable for being associated with calibration means (see fig.5)) permitting the determination of the at least spatial characteristics of the reproduction unit (see fig. 1 and see col. 9 line 30-col. 10 line 67); and a device characterized in that the calibration means comprise means (see fig.5) for acquiring a sound wave which comprise four pressure sensors(106) arranged in accordance with a general tetrahedral shape(In Ise, see detailed description page 12 [0089]- page 13, [0093]).

Art Unit: 2614

Consider claims 19-22, 25 and 28 Arnold as modified by Gerzon teaches a device wherein the means(see fig.1) for determining characteristics are suitable for determining sound characteristics of at least one of the elements of the reproduction unit , the device comprising means(see fig.1) for determining sound compensation filters using the sound characteristics, and the means(30) for determining at least one control signal being suitable for the application of the sound compensation filters(see col. 3 line 5-67); and a device characterized wherein the means(see fig.1) for determining the sound characteristics are suitable for determining the frequency response of the elements of the reproduction unit(see fig. 1 and see col. 9 line 30-col. 10 line 67); and an apparatus for processing audio and video data, comprising means (see fig.1) for determining a plurality of sound data input signals (10) each associated with a predetermined general reproduction direction defined by a given point (c), characterized in that it also comprises a device for controlling reproduction unit (see fig. 1 and see col. 9 line 30-col. 10 line 67); and an apparatus wherein the means(see fig.1) for determining a plurality of input signals(10) are formed by a unit for reading and decoding digital audio and/or video discs(see figs. 1-6 and see col. 9 line 30-col. 10 line 67) and the device wherein, when being applied, the spatial adaptation matrix remains as it has been determined(In Gerzon, see fig. 10 (22,23) and col.16 line 5-col. 17 line 67).

Consider claims 23 and 24, Arnold as modified by Gerzon teaches the spatial characteristics of the reproduction unit are determined without using the multi-channel audio signal (see fig. 1 and col. 11 line 1-67) and the spatial adaptation matrix is

Art Unit: 2614

determined without using the multi- channel audio signal (In Gerzon, see fig. 10 (22,23) and col.16 line 5-col. 17 line 67).

Consider claims 26 and 27, they are essentially similar to claims 23 and 24 and are rejected for the reason stated above apropos to claims 23 and 24.

### ***Response to Arguments***

6. Applicant's arguments with respect to claims 1-28 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that Arnold does not disclose receiving multi-channel signals as input (see the remarks page 14- page 15).

The examiner respectfully disagreed. Arnold discloses determining via a computer parameters describing the reproduction direction of each channel of a multi-channel audio signal (see fig.1 (10), (reads on the sound source, the sound source may be a stereophonic or an quadraphonic, a stereophonic or an quadraphonic includes two or more channels) and see col. 1 line 58-col. 2 line 54). It meets the limitation as recited in claim 1 and 15.

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cooper et al. (US PAT. 5,333,200) is cited to show other related method and device for controlling unit using a multi-channel signal.

Art Unit: 2614

8. Any response to this action should be mailed to:

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lao, Lun-See whose telephone number is (571) 272-7501. The examiner can normally be reached on Monday-Friday from 8:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin, can be reached on (571) 272-7848.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 whose telephone number is (571) 272-2600.

Lao, Lun-See  
/LUN-SEE LAO/  
Examiner, Art Unit 2614  
Patent Examiner  
US Patent and Trademark Office  
Knox  
571-272-7501  
Date 09-23-2010

/Vivian Chin/  
Supervisory Patent Examiner, Art Unit 2614